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ABSTRACT

The purpose of this study, which was carried out during the 1972-73 school year at three parochial schools in the Houston area, was to determine the effectiveness of the Toothkeeper Program, a multimedia program of oral hygiene training carefully developed and packaged to establish effective long-term dental hygiene practice. The study population consisted of students in the first through sixth grades. Entire classes were designated as control or experimental subjects. The teachers of the experimental classes participated in a 3-hour workshop in the use of the Toothkeeper Program presented by the manufacturer of the product. The program was then carried out for a period of 16 weeks. The effectiveness of the program was evaluated through two clinical assessments of oral health and a questionnaire. A review of the clinical data (mean gingevitis and mean plaque scores) and photographic data indicates conclusively that the participants in the progra did not show improved oral health and tooth cleanliness as compared with the participants who were not in the program. The program was apparently ineffective even for the short term. (HMD)

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Model Teacher - School Dental Hygiene Program

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3801 Cullen Boulevard
Houston, Texas

Dr. Richard I. Evans
Project Director

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I. Contract Summary

A. Purpose, Scope and Objectives

The project was conducted during the 1972-1973 academic year in three parochial elementary schools located in Houston, Texas. The purpose of the project was to evaluate a carefully developed and packaged multi-media program* of oral hygiene training as a means of establishing effective, long term dental hygiene practice. The Division was interested in evaluating the Toothkeeper Program as it was being promoted extensively by the manufacturer to many agencies within DHEW.

The rationale behind the Toothkeeper Program and potential benefits to be derived from its incorporation into a school dental health program are printed in the Dental Health Guide for the Dental Consultant, Toothkeeper Program and reproduced below:

> "The dentist of today is in a unique position to help fight dental disease rather than just provide dental care and services. Many dental offices are now organized to help patients treat dental disease by systematic training in personal dental care. Realizing what can be accomplished on a one-to-one basis in the dental office, the dentist can now use these same principles in community action programs to help train large groups of people.
>
> THE SECRET is to use a person who is in a position to influence a total population. This person is the elementary classroom teacher. During a generation the teacher can help change the personal dental care habits of nearly all of our citizens. The ECCO Dental Disease Prevention Program** is based upon the utilization of this professionally trained educator.

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*Toothkeeper Program distributed by the Den-Tal-Ez Mfg. Co., Des Moines, IA and referred to as the Model Teacher-School Dental Hygiene Program (MT-SDHP) in the title of this report.

**Now known as the Toothkeeper Program

HOW DOES IT WORK? First, the dentist must train the teacher in the necessary knowledge and techniques that form the basis of a sound personal dental care program. She must then be provided with the teaching aids required to impart this message in the classroom, using her talents so that the young student can be trained.

HOWEVER, THE PIVOTAL ROLE IN THE ENTIRE PROGRAM LIES IN THE HANDS OF THE SCHOOL'S DENTAL CONSULTANT WHO IS PRIMARILY RESPONSIBLE FOR SEEING THAT EFFECTIVE TEACHER TRAINING OCCURS.

WHEN THE DENTIST TRAINS THE TEACHER AND THE TEACHER TRAINS THE CHILD, DENTAL DISEASE CAN BE DEFEATED."

The study population consisted of students in the 1st through 6th grades in three separate schools. Entire classrooms in each school were designated as either control or experimental by a random process.

The teachers of the classrooms designated as experimental groups were trained in a workshop session developed and conducted by the Den-Tal-Ez Company. The Toothkeeper Program was then carried out in the experimental classes with the techniques and teaching aids according to the manufacturer's instructions for a period of 16 weeks.

The effectiveness of the Toothkeeper Program in changing oral hygiene practices and in improving oral health was evaluated through the use of two clinical assessments of oral health and a questionnaire. The clinical examinations were conducted and the questionnaire data collected before the program began, at the completion of the program (16 weeks later) and again 16 weeks after the program ended.

The effect of the program on the teachers was evaluated in a similar way. In addition, a photographic method was used to evaluate the effect of the program in small groups of 6th grade students.

B. Significant Findings and Conclusions

There were 118 students in the experimental groups and 95 students in the control groups present for the entire 32 week period and who received all 3 examinations.

Mean gingivitis scores worsened (increased) in both groups from the baseline to the second examination. From the second to the third examination the gingival health (gingivitis scores) of the experimental group continued to worsen while the control group remained constant. At the third examination mean gingivitis scores were significantly better* for the control group.

Mean plaque scores (tooth cleanliness) for the control group remained almost constant for all three examinations. In contrast, the plaque scores for the experimental group increased slightly from baseline to second examination and returned to the baseline level by the third examination.

Clinical and questionnaire data collected on the teachers, while of some interest, did not contribute to the evaluation of the Toothkeeper Program because of the limited number of teachers (15) in each of the control and experimental groups.

Examination of questionnaire data collected after 32 weeks for all children completing questionnaires indicates no differences in the proportion of children in each group who brushed daily or who used disclosing tablets at home. At the same time period a significantly greater proportion of students in the control group than in the experimental group reported using dental floss at home.

The photographs showing tooth cleanliness of the small groups of additional 6th grade participants were evaluated for changes. Analysis of this data showed a slight improvement in tooth cleanliness between the baseline and the second examination for

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*$p<.05$, multivariate analysis of variance used.

both the control and the experimental groups. From the second to the third examination the control group worsened while the experimental group improved. The difference between the groups at any time was not statistically significant.*

A review of the clinical data (gingivitis and plaque scores) and the photographic data indicates conclusively that the 1st-6th grade participants in the Toothkeeper Program did not show improved oral health and tooth cleanliness as compared with the participants who were not in the program. The program apparently is ineffective even for the short term.

There are several likely reasons why the Toothkeeper Program is ineffective. First, the Toothkeeper Program utilizes the dentist to get facts across to the teacher concerning dental disease and how it can be prevented and to train the teacher in the necessary oral hygiene skills. The workshop to accomplish both of these objectives is of 3 hours duration. It is not known at this time if the average dentist is capable of effectively training the teacher and if the 3 hour workshop is of the correct length. Second, it is not known if the average teacher after participating in a 3 hour workshop and utilizing the Toothkeeper teaching aids can train children in effective oral hygiene practices. Third, even supervised care of teeth may be too infrequent (two times/week at end of program) during the week to have an effect. Fourth, the program may not shift effectively from supervised care (at school) to self-care (at home) of teeth.

In addition, the finding concerning evidence that the mean gingivitis scores were significantly lower in control groups gives rise to speculation by the Project Director concerning the possibility of negative impact of the program: (1) Is it possible that for some children in the experimental groups repeated exposure to persuasion to engage in oral hygiene behavior can under some conditions reach a point of satiation? That, in a sense, the children - perhaps unconsciously - begin to be "turned off"

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*$p > .05$

by the whole idea. In fact, in the same sense that Janis and Feshbach (1953) in the Yale study of fear arousal in dental hygiene messages suggest that high fear leads to a "defensive avoidance" reaction and, therefore, less likelihood of following oral hygiene instructions, could over-exposure to the message in the sense of constantly "nagging" a child to take care of his or her teeth actually result in "defensive avoidance" --- the child not being as thorough or even as frequent in the home care of his or her teeth? (2) Is it possible that, in some of the other children in the experimental groups, taking care of their teeth a few times in school relieves any "guilt" they have about taking care of their teeth, so they don't feel they have to be as thorough and/or frequent in brushing their teeth at home?

The present analysis has emphasized findings based on objective measures. Some speculation about the possible negative impact of the program has been presented as well as possible reasons why the program may be merely ineffective.

C. Problems Encountered

One teacher selected initially by a random process to participate in the Toothkeeper Program refused; therefore, a second class and teacher were selected randomly. There is no reason to believe that this procedure could have influenced the outcome of the study.

During the conduct of the study, at about the 12 week period, additional toothbrushes and disclosing tablets were purchased for the participants as the original ones were worn out or used up. This indicates that the total number of toothbrushes and disclosing tablets in each Toothkeeper kit may be too small.

The most distressing problem to the Project Officer as well as the Project Director developed as a result of our mobile society. The systems analyst who developed the plan of analysis and was processing the data left the University of Houston before the data analysis was completed. He continued with the data processing at his new location but this resulted in considerable delay. The first version of the final report contained some obvious data processing errors and the Project Officer did not receive an acceptable final report until late November, 1973.

D. How Work Accomplished Measured Up to Expectations

The conduct of the project with the exception of the delay in data processing reached expectations.

The Project Director devoted enough of his time to oversee the general conduct of the project. He recruited a very capable assistant who performed an outstanding job in maintaining tne daily aspects of the school activities. The teachers and the students were very cooperative during the examination sessions. The teachers were very cooperative in conducting the classroom activities per instructions in the Toothkeeper Teacher's Manual.

Even though it was disappointing to find out that the Toothkeeper program was ineffective in this evaluation, such information will be invaluable to others planning to invest large amounts of money in the Toothkeeper.

E. Cost Data

The contract was of the fixed fee type in the amount of $30,315.60.

II. Project Evaluation

A. Validity of Results

The results of this project are believed to be valid.

A random process was used to designate classrooms as control or experimental. Representatives from the Toothkeeper Program conducted the initial teacher workshop according to their established standards. A program coordinator visited each participating school on a regular basis in order to assist with any unforeseen problems and to keep the teachers supplied with the required materials.

All clinical assessments were made by the same examiners (staff members of the Division of Dental Health). The same rooms, equipment and procedures were used in all three examinations to reduce possible bias. The examiners were not aware whether participants were from control or experimental classrooms.

The photographic data were scored in a "blind manner" by evaluators not familiar with the project.

B. Usefulness of the Results for Program Purposes

The results are useful in several ways:

(1) Various federal agencies have expended funds to purchase the Toothkeeper Program. The decision to purchase the program was based partially on unsubstantiated claims of effectiveness as promoted by the Toothkeeper manufacturer. The present contract is the first evaluation of the Toothkeeper Program to utilize a control group and to arrange the clinical examinations so that the examiners never knew whether participants were control or experimental subjects. Hopefully, the present results will be studied thoroughly and the decision will be made to curtail the expenditure of federal funds on the Toothkeeper pending results of other evaluations or modifications made in the program.

(2) Some state and local health departments as well as school districts have requested evaluatory data on the Toothkeeper.

(3) Information gathered on the possibility of this type of dental health education program producing a "defensive avoidance" reaction is useful to all areas of health education.

III. Site Visits

Site visits* were made on:

(1) August 1-3, 1972
(2) September 13-23, 1972
(3) January 18-25, 1973
(4) May 18-24, 1973

Four site visits were made to the University of Houston during the contract period. The last three visits were made in conjunction with the schedule for clinical assessments of the oral health status of the participants. The spacing of the visits allowed the Project Officer to gather firsthand information on the conduct of the study as it progressed. Problems not handled during the site visits were decided upon during weekly telephone conversations between the Contract Officer and the Project Director.

*These dates include travel days.

IV. Dissemination of Results

A report on the project will be distributed to all ten Regional Offices of the Department of Health, Education, and Welfare as well as to all Branches and Offices of the Division of Dental Health. In addition, copies of the report will be made available to interested parties at the national, state and local levels.

A report will be prepared for publication in a professional journal through joint efforts of the contractor and the Division of Dental Health.

V. Proposed Action

Ideally, the project should be replicated in a different population to ascertain whether the results obtained were due to some peculiarity of the particular selected population. Because of budgetary limitations and for other reasons, the Division of Dental Health does not choose to replicate this study. Therefore, no further effort in this direction is contemp'ated at the present time.

VI. Statements of Contractor Compliance

All articles and services required to be furnished by the contractor have been delivered to the Project Officer and accepted.

All Government furnished property loaned to the contractor has been returned to the Division of Dental Health.

A single lens reflex camera, ring flash and miscellaneous camera accessories were purchased with contract funds and are to be returned to the Government at the completion of the contract. The Property Management Officer, Division of Dental Health, is in the process of arranging for the transportation of these items from Houston to Bethesda.